

SurTest

Technical Reference and Operating Manual

Advancing with Technology

ElektroPhysik

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1. Foreword

The roughness meter SurTest uses a piezoelectric stylus of which the diamond tip sensitively traces the rough surface to be measured.

The remarkable features of SurTest are its high measuring accuracy, its large measuring range and its safe operation.

The portable roughness meter is suitable for measurements on metals and non-metals in the field of quality inspection of incoming goods, in production and on site.

The gauge is factory preset to measurements by the Ra method. In case only measurements in Rz are required, a precision calibration for Rz is to be carried out.

Take at least two measurements with the gauge placed on the surface in an upright position. Only use the value of the second measurement.

2. Safety instructions

The protecting cap should always be fitted after switching the gauge off in order to protect the diamond stylus.

Mechanical shocks of any kind should be avoided.

Please observe the allowed ambient temperature and operation temperature (e.g. protect the gauge from sunlight).

3. Operation

3.1 Preparation

It is important to remove the protective cap before the gauge is switched on.

3.2 Start-up functions

After the gauge is switched on, a short check of display and functions is performed. The following indications will appear on the display:



Operation

A successful check is confirmed by a bleep. The gauge is now ready to measure and the display shows:



Note:

The gauge does not switch off automatically. Every 30 seconds a bleep reminds you to switch off the gauge when not in use.

3.3 Settings

The parameters set for the last measurement are shown on the display.

3.3.1 Switch between Ra/Rz

The measuring parameter Ra or Rz is selected by means of the key Ra/z \ CAL.

3.3.2 Select a single measuring section

The length of the measuring section is selected with the (λ C/in/m key. Each of the possible measuring section is allocated a particular roughness which can be taken from the following table:

Single measuring section	Roughness Ra	Roughness Rz
λ 1 0.25 mm	0.05 ... 0.2 μ m	0.10 ... 0.60 μ m
λ 2 0.8 mm	0.10 ... 2.5 μ m	0.50 ... 15.0 μ m
λ 3 2.5 mm	0.60 ... 10.0 μ m	4.00 ... 50.0 μ m

The highest accuracy of the roughness value is obtained by selecting a single measuring section which corresponds to the roughness value to be measured.

3.3.3 Switching between μ m/inch

If the λ C/in/m key is pressed down for more than 5 seconds, the gauge automatically switches to the other measuring unit. (The measuring value is converted into the other measuring unit).

3.4 Measuring

Carefully place the gauge onto the surface to be measured observing the marks of the measuring section. Now press the start button at the top of the gauge. Before the first reading is taken, an "empty" measurement of which the value is to be ignored must be carried out with the gauge placed onto the surface. Take a further measurement without lifting the gauge from the surface. The value taken in the second measurement and all further readings taken with the gauge placed onto the surface are valid.

4. Checking the accuracy

After a certain period the gauge should be checked with the help of a roughness standard (included in the delivery schedule). The measurement should be performed as described above. The measuring value must correspond to the roughness indicated on the standard. In case the two values differ, we recommend you to sending the gauge to your local dealer or ElektroPhysik.

5. Calibration

5.1 General remarks on calibration

The gauge is factory preset to the Ra method. Precision calibration is only possible for Ra or Rz, not for both. Precision calibration for Ra has been performed by the manufacturer. Consequently, when measuring in Rz the inaccuracy might be higher than 6 %. If only measurements by the Rz method are taken, a precision calibration for Rz must be carried out in any case. A new precision calibration automatically deletes the existing calibration. The precision calibration can only be carried out for the intermediate wave length λ 3 2,5 mm.

5.2 Precision calibration Ra

The gauge is calibrated against the roughness standard which is delivered with the gauge. Please proceed as follows:

1. Switch on gauge.
2. Switch to Ra and μ m.
3. Switch off gauge.

4. Press down Ra/z \ CAL and keep the key depressed while the gauge is switched on. CAL, RA, $\lambda 3$ and a number are displayed.
5. Adjust to the value of the roughness standard by means of the Ra/z \ CAL or λC \ in/m key.
6. Carefully place the gauge on the roughness standard and wait approx. 5 seconds. Start the measurement with the start button.
7. The end of the precision calibration is confirmed by two bleeps and a value with a tolerance of $\pm 6\%$ of the value indicated on the roughness standard is displayed.
8. The CAL mode is automatically discontinued.
9. Take a further measurement on the roughness standard in order to check whether the calibration was carried out successfully. As the first reading taken after placing the gauge onto the surface should always be ignored (except when calibrating), four measurements need to be taken in order to obtain a mean.
10. Should the result exceed the tolerance, please repeat the calibration procedure.

5.3 Precision calibration Rz

The Rz value is obtained by means of the percentage modification of the Ra value.

1. Switch on gauge.
2. Switch to Rz and μm .
3. Carefully place the gauge on the roughness standard and wait approx. 5 seconds. Start the measurement with the start key. Ignore the first measurement. Take three more measurements.
4. Evaluate a mean from the three measurements and calculate the deviation from the roughness value of the standard in percent.
5. Switch to Ra by means of the Ra/z \ CAL key.
6. Switch off gauge.
7. Press down Ra/z \ CAL and keep the key depressed while the gauge is switched on. CAL, RA, $\lambda 3$ and a number are displayed.
8. Adjust to the value of the roughness standard by means of the Ra/z \ CAL or λC \ in/m key.

9. Carefully place the gauge on the roughness standard and wait approx. 5 seconds. Start the measurement with the start button.
10. The end of the precision calibration is confirmed by two bleeps and a value with a tolerance of $\pm 6\%$ of the value indicated on the roughness standard is displayed.
11. The CAL mode is automatically discontinued.
12. Switch off gauge.
13. Press down Ra/z \ CAL and keep the key depressed while the gauge is switched on. CAL, RA, $\lambda 3$ and a number are displayed.
14. Adjust to the percentage deviation of the value of the roughness standard with the Ra/z \ CAL or λC \ in/m key, e.g. $3.35\ \mu\text{m} + 10\% = 3.68\ \mu\text{m}$.
15. Carefully place the gauge on the roughness standard and wait approx. 5 seconds. Start the measurement with the start button.
16. The end of the precision calibration is confirmed by two bleeps. The gauge now displays the modified Ra value.
17. Switch to Rz.
18. Check the Rz value with at least four measurements. Should the measuring value be out of tolerance, please repeat the calibration starting from point 13.

5.4 Deleting the precision calibration

The factory preset calibration can be reactivated by deleting the precision calibration.

1. Switch off gauge.
2. Press down λC \ in/m key and keep the key depressed while the gauge is switched on.
3. A single bleep confirms that the precision calibration has been deleted.

6. Battery charging

If the voltage of the built-in accumulator battery is too low, BAT will be flashing in the upper left corner of the display. Switch off gauge and connect the mains unit to the plug for the mains unit. The optimal period for battery charging is 10 - 15 hours.

7. Replacing the rechargeable batteries

The CrNi accumulator batteries can be flat after some years. For installation of new accumulator batteries please send the gauge to your local dealer or ElektroPhysik.

8. Replacing the measuring sensor

A worn sensor should in any case be replaced by your local dealer or ElektroPhysik. It is not possible for the customer to replace the measuring sensor himself.

9. Maintenance

It is important to protect the stylus from mechanical shocks, dust, strong magnetic fields and greasy materials. The stylus can be cleaned with a cotton bud soaked in alcohol. The protective cap should always be put on the stylus when the gauge is not in use.

10. Technical data

Roughness parameter:	Ra, Rz
Measuring range:	Ra: 0.05 ... 15.0 µm Rz: 0.1 ... 50.0 µm
Tolerance:	± 6 % of reading
Surface to be measured:	flat or convex; in grooves: min. width 30 mm, min. length 80 mm
Cut-off length:	0.25 mm/0.8 mm/2.5 mm
Total measured length:	1.25 mm/4.0 mm/5.0 mm
Tracing length:	6 mm
Detector:	piezo-electric stylus with diamond tip, radius 10 µm ± 2,5 µm
Measuring unit:	µm - mils to choice
Ambient temperature:	0° ... 40° C
Humidity:	< 90 %
Power supply:	built-in rechargeable battery with indication of battery condition; mains unit 220 V, 50 ... 60 Hz
Dimensions:	125 mm x 73 mm x 26 mm
Weight:	200 g

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